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Phase-Out Maintenance Optimization for an Aircraft Fleet

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Abstract:

This paper presents a novel approach for cost-effective optimization of stop-maintenance strategies for a set of repairable items (rotables). The optimization method has two steps. First, the novel concept of matrix simulations is introduced to locate the solution space of the optimization problem in question. Second, a genetic algorithm is applied to find the minimum cost solution. The combination of matrix simulations and genetic algorithm is shown to constitute a powerful method for solving the optimization problem in a fast manner. To demonstrate the efficacy of the proposed method, it is compared with a crude search, and a steepest descent algorithm. Our proposed method is faster than the crude search and also locates the optimum more often than the steepest descent search. The method is illustrated by applying it to a phase-out scenario of an aircraft fleet, where the optimal stop-maintenance strategy is determined for a set of rotables.

Keywords: phase out, maintenance, optimization, simulation, steepest descent, genetic algorithm

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1. Introduction

When working with pools of complex technical systems such as aircraft fleets and their associated support systems, it is important to have a product lifecycle management (PLM) program for the fleet during the whole of its lifecycle. A PLM program aims to streamline the flow of information about the

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